

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF

Confirmation No.: unknown

TAKAHASHI et al.

Group Art Unit: 2872

Cont. of Appln. No.: 09/570,652

Examiner: Shafer

Filed: May 12, 2000

Filed: January 8, 2002

Title: PRISM OPTICAL ELEMENT IMAGE OBSERVATION APPARATUS, AND IMAGE DISPLAY

January 8, 2002

* * * * *

AMENDMENT

Hon. Commissioner of Patents
Washington, D.C. 20231

Sir:

Before examination on the merits, please amend the above identified application as follows:

IN THE SPECIFICATION:

Page 1, line 1 insert the following new paragraph:

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Application No. 09/570,652, filed May 12, 2000, which was a divisional application of U.S. Application No. 08/867,779, filed June 3, 1997, (now abandoned), the specifications of which are incorporated by reference for all purposes.

Page 1, line 6, replace the first two paragraphs with the following:

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a prism optical element, an image observation apparatus and an image display apparatus. More particularly, the present invention relates to

a head- or face-mounted image display apparatus that can be retained on the observer's head or face.

2. Discussion of Related Art

An example of a conventional head- or face-mounted image display apparatus, an image display apparatus disclosed in Japanese Patent Application Unexamined Publication (KOKAI) No. 3-101709 (19910 is known. In this image display apparatus, an image that is displayed by an image display device is transmitted as an aerial image by a relay optical system including a positive lens, and the aerial image is projected into an observer's eyeball as an enlarged image by an ocular optical system formed from a concave reflecting mirror.

Page 14, beginning at line 16, and continuing on page 15, lines 1-3, delete the entire paragraph and replace it with the following:

First, assuming that the prism optical element according to the present invention is used as an ocular optical system (observation optical system) of an image observation apparatus or an image display apparatus, the prism optical element is formed from a prism member in which at least three internal reflection take place, and the prism member is filled with a medium having a refractive index larger than 1. Therefore, the ocular optical system can be made extremely thin by the above-described optical path folding effect. In addition, aberration correction can be made even more effectively by the arrangement in which at least three internal reflections take place. Thus, it is possible to present an observation image which is clear as far as the edges of the image field. In this regard, the prism optical element according to the present invention will be described below more specifically.

See the attached Appendix for the changes made to effect the above paragraphs

REMARKS

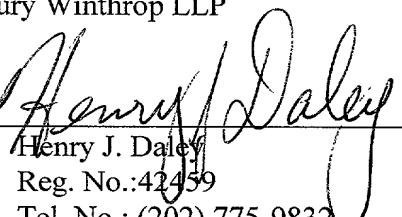
Consideration and allowance of the present application are respectfully requested. Applicants have carried forward the amendment to the specification from the parent application (U.S. Application No. 08/867,779). No new matter has been added. An early and favorable action of the merits is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached Appendix is captioned "Version with markings to show changes made".

Respectfully submitted,

Pillsbury Winthrop LLP

By:


Henry J. Daley
Reg. No.: 42459
Tel. No.: (202) 775-9832
Fax No.: (202) 833-8491

HJD\dlh
1133 Connecticut Avenue, NW
Washington, DC 20036

(202) 775-9800

Enclosure: Appendix

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 1, line 1 insert the following new paragraph:

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. Application No. 09/570,652, filed May 12, 2000, which was a divisional application of U.S. Application No. 08/867,779, filed June 3, 1997, (now abandoned), the specifications of which are incorporated by reference for all purposes.

Page 1, line 6, replace the first two paragraphs with the following:

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a prism optical element, an image observation apparatus and an image display apparatus. More particularly, the present invention relates to a head- or face-mounted image display apparatus that can be retained on the observer's head or face.

2. Discussion of Related Art

An example of a conventional head- or face-mounted image display apparatus, an image display apparatus disclosed in Japanese Patent Application Unexamined Publication (KOKAI) No. 3-101709 (19910 is known. In this image display apparatus, an image that is displayed by an image display device is transmitted as an aerial image by a relay optical system including a positive lens, and the aerial image is projected into an observer's eyeball as an enlarged image by an ocular optical system formed from a concave reflecting mirror.

At pages 14, lines 16-29 and 15, lines 1-3:

First, assuming that the prism optical element according to the present invention is used as an ocular optical system (observation optical system) of an image observation apparatus or an image display apparatus, the prism optical element is formed from a prism member in which at least three internal reflection take place, and the prism member is filled

with a medium having a refractive index larger than 1. Therefore, the ocular optical system can be made extremely thin by the above-described optical path folding effect. In addition, aberration [correction] can be [made] corrected even more effectively by the arrangement in which at least three internal reflections take place. Thus, it is possible to present an observation image which is clear as far as the edges of the image field. In this regard, the prism optical element according to the present invention will be described below more specifically.